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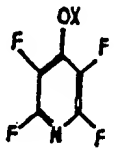
(54) DERIVATIVES OF 4-HYDROXYTETRAFLUOROPYRIDINE AND THE USE THEREOF AS PLANT GROWTH REGULATORS

(71) We, IMPERIAL CHEMICAL INDUSTRIES LIMITED, a British Company of Imperial Chemical House, Millbank, London, S.W.1., do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to chemical compounds useful in inhibiting the growth of plants.

According to the present invention there are provided new compounds having growth-stunting effects on monocotyledonous plants, and having the formula:—

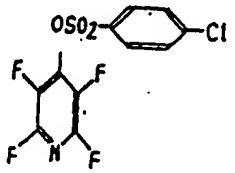


in which X represents either a cation of an alkaline earth metal or transition metal, or an ammonium or substituted ammonium ion, or an esterifying group. Preferred esters include carboxylate and sulphonate esters of 4-hydroxytetrafluoropyridine. Particularly preferred carboxylate esters are the acetate and benzoate. Particularly preferred sulphonate esters are the methanesulphonate and the benzenesulphonate.

The following Examples illustrate the invention.

EXAMPLE 1

This Example illustrates the preparation of 4 - p - chlorobenzenesulphonyloxytetrafluoropyridine, having the formula:—



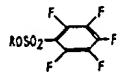
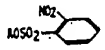
A solution of the potassium salt of 4-hydroxytetrafluoro - pyridine (30% w/v) in dry acetone was treated with a solution (25% w/v) of *p* - chlorobenzenesulphonyl chloride (1 molar proportion) in dry acetone at such a rate that the temperature of the reaction mixture did not exceed 25°C. The mixture was then heated under reflux for 3 hours, cooled and filtered. Evaporation of the filtrate and recrystallisation of the residue gave white crystals m.p. 68—69°.

EXAMPLE 2

This Example illustrates the preparation of further esters of 4-hydroxytetrafluoropyridine. These were prepared by the procedure of Example 1, using the appropriate acid chloride. The compounds so prepared are set out in Table 1 below, in which the symbol R indicates the group

no Rx use

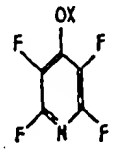
TABLE 1

Compound No.	Structure	Melting point or boiling point °C
1		B.p. 134—136°/0.05 mm Hg
2	$ROSO_2CH_3$	B.p. 62—64°/0.05 mm Hg
3		M.p. 51—53°
4		M.p. 57°
5	$ROCOCH_3$	M.p. 25°
6		B.p. 92—94°/0.1 mm Hg
7		M.p. 75—76°
8	$ROSO_2C_4H_{18}^n$	B.p. 98—100°/0.06 mm Hg

This application is a divisional of U.K. Patent Application No. 33974/67. (Serial No. 1242056). Claim 1 of this Application reads as follows: "A process of stunting the growth of monocotyledonous plants, which comprises applying to the plants 4 - hydroxytetrafluoropyridine or a salt, ether or ester thereof, in an amount sufficient to inhibit the growth of, but insufficient to kill the plants."

WHAT WE CLAIM IS:—

1. A compound of the formula:—



wherein X represents either a cation of an alkaline earth metal or transition metal, or an ammonium or substituted ammonium ion, or an esterifying group.

2. A compound as claimed in claim 1 which is a carboxylate ester of 4-hydroxytetrafluoropyridine.

3. A compound as claimed in claim 1 which is a sulphonate ester of 4 - hydroxytetrafluoropyridine.

4. 4-Acetoxytetrafluoropyridine.

5. 4 - Benzoyloxytetrafluoropyridine.

6. 4 - Methanesulphonyloxytetrafluoropyridine.

7. 4 - Benzenesulphonyloxytetrafluoropyridine.

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